

REMARKS

Applicants thank the Examiner for the thorough consideration given the present application. Claims 1-23 are pending in the present application. Claims 1 - 21 are amended. Claims 1 and 11 are independent claims. Claims 22 and 23 are new.

Claim Objections

Claims 5 – 10 and 15 – 21 are objected to as being improper multiple dependent claims. Applicants hereby amend these claims to place them in proper dependent claim format. Accordingly, reconsideration and withdrawal of this objection is respectfully requested.

Claim Rejections – 35 U.S.C. §103(a)

Claims 1 – 4 and 11 – 14 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Worldwide Patent Publication WO 01/81031 by Andersson (“Andersson”) or U.S. Patent 4,863,538 to Deckard (“Deckard ‘538”) in view of U.S. Patent 5,155,324 to Deckard (“Deckard ‘324”) or U.S. Patent 5,352,405 to Beaman (“Beaman”). Insofar as it pertains to the presently pending claims, this rejection is respectfully traversed.

Claim 1

Independent claim 1 pertains to a method for producing three-dimensional objects by fusing together of selected areas of a powder bed, the method requiring, in pertinent part, that “fusing includes dividing said selected area into a plurality of smaller part areas which each comprise an inner area I and an edge R and said determining an operating scheme includes determining priority for treating said plurality of smaller part areas such that heating of the selected area takes place in a relatively homogeneous way.” The Office Action admits that Andersson and Deckard ‘538 do not teach or suggest this limitation, and instead relies on either Beaman or Deckard ‘324 for this teaching.

Deckard '324

Deckard '324 teaches an apparatus and method for producing parts by laser sintering (Abstract). Specifically, Deckard '324 teaches alternating the scan directions of a laser beam across successive layers during production, thereby reducing distortion and more clearly defining the edges of the part produced (Abstract).

In Figs. 3a – 6, Deckard '324 shows a cross section of a part being produced, the part having both an outer edge and an inner edge. Deckard '324 teaches tracing both the interior and exterior boundaries of a cross section with a laser and then moving the laser beam across the entire cross section – omitting those interior sections which are specifically excluded from the part being produced (Col. 10, lines 9 – 26). Deckard '324 contains no teaching or suggestion of doing anything other than sequentially operating on the entire cross-section. Although Deckard '324 discusses dividing the outside boundaries of a cross section into a plurality of line segments (Col. 10, lines 9 – 26), Deckard '324 is no teaching or suggestion of dividing the cross-section into a plurality of smaller part areas as required by independent claim 1.

Beaman

Beaman teaches a method and apparatus for fabricating three-dimensional objects by laser sintering (Abstract). Specifically, Beaman teaches dividing a cross-section of an object being produced into multiple scan areas in order to find a minimal scan area that reduces the scan and return time (Col. 10, line 64 – Col. 11, line 30).

Beaman teaches more efficient scanning patterns to improve the quality of objects produced, but limits a discussion of object temperature management to techniques such as radiant heaters and heated directed gas flow (Col. 11, lines 45 – 50). Also, the types of laser beams taught in Beaman do not give rise to temperatures sufficiently high that they may damage the material being fused.

By contrast, the present invention pertains to a radiation gun that generates a high-power beam and can be redirected rapidly. The problem solved by the present invention is how to

effectively avoid damaging the material being fused during a production process. To this end, independent claim 1 requires “determining priority for treating said plurality of smaller part areas such that heating of the selected area takes place in a relatively homogeneous way.”

Applicants respectfully submit that Beaman fails to teach or suggest distributing energy from a radiation gun across a selected area so that the whole area is heated in a relatively homogenous fashion. Beaman instead relies on radiant heating and heated gas flow to manage the temperature of an object being produced. Applicants therefore respectfully submit that Beaman fails to teach or suggest “determining priority for treating said plurality of smaller part areas such that heating of the selected area takes place in a relatively homogeneous way” as required by independent claim 1.

Claim 11

Independent claim 11 pertains to a device that produces a three-dimensional product by successively fusing together successively formed cross sections of the product, the device requiring, in pertinent part, “where the control computer divides at least a selected area of each cross-section into a plurality of smaller part areas which each comprise an inner area I and an edge R, and controls the radiation gun and beam guide according to an operating scheme for forming each cross section of said three-dimensional product by determining a priority for delivering energy to said plurality of smaller part areas such that heating of the selected area takes place in a relatively homogeneous way.”

Applicants respectfully submit that claim 11 pertains to a device that carries out the method of independent claim 1, and that specifically the control computer controls the division and order of treatment for the smaller part areas. Applicants therefore respectfully submit that Beaman and Deckard ‘324 are deficient in their teaching with respect to independent claim 11 for at least the same reasons as set forth with respect to independent claim 1.

Claims 2 – 10 and 12 – 24

Applicants respectfully submit that claims 2 – 10 and 12 – 24 are allowable at least by virtue of their dependency from independent claims 1 and 11.

Summary

At least in view of the above, Applicants respectfully submit that none of the applied references, taken either alone or in combination (assuming the references may be combined, which Applicants do not admit), teach or suggest all the limitations of independent claims 1 or 11 or any claims depending therefrom. Applicants further submit that the process of dividing a selected section into, and prioritizing the treatment of, a plurality of smaller areas based on a scheme that ensures relatively homogenous heating of that selected section during a fabrication process is not rendered obvious based on the teachings of any of the applied references, taken either alone or in combination (assuming the references may be combined, which Applicants do not admit). Accordingly, reconsideration and withdrawal of this rejection is respectfully requested.

CONCLUSION

Since the remaining patents cited by the Examiner have not been utilized to reject the claims, but to merely show the state of the art, no comment need be made with respect thereto.

In view of the above amendment, applicant believes the pending application is in condition for allowance. Thus, the Examiner is respectfully requested to reconsider the outstanding rejections and issue a Notice of Allowance in the present application.

However, should the Examiner believe that any outstanding matters remain in the present application, the Examiner is requested to contact Applicants' representative, Naphtali Matlis (Reg. No. 61,592) at the telephone number of the undersigned in order to discuss the application and expedite prosecution.

If necessary, the Commissioner is hereby authorized in this, concurrent, and future replies to charge payment or credit any overpayment to Deposit Account No. 02-2448 for any additional fees required under 37.C.F.R. §§1.16 or 1.17; particularly, extension of time fees.

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Respectfully submitted,

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